

V. ENVIRONMENTAL CONSEQUENCES

To focus the discussion of potential consequences of the proposed action and alternative, key impact topics have been selected. Impacts selected to be analyzed were based on concerns expressed by the public and other agencies during scoping, legislative requirements, and key resources within the projected impact area. Specific impact topics selected to be analyzed include impacts on the Florida panther, the Texas cougar, other threatened and endangered species, prey resources, land use activities, recreational activities, sociological factors, and economic factors.

Alternative 1 - Continue Current Genetic Management Program

(No Action) -- Under the current genetic management program, which is designed to utilize only genetic resources available in the present population (wild and captive individuals taken from the wild), a large captive breeding program is to be established and managed (possibly exceeding 200 adults) in an effort to buffer genetic erosion and provide security against extinction. This program was initiated in 1991 with the removal of 6 kittens from the wild. Four additional kittens were removed in 1992. The program, however, was placed on hold in 1993 to allow for the development and consideration of other alternatives. Under this alternative, genetic management is to be carried out through selective breeding in captivity, the exchange of individuals between captive and wild populations, and the translocation of individuals within the wild population. Genetic material from other *Felis concolor* subspecies will not be used.

- A. **Impacts to *F.c. coryi*** - The most immediate direct impact to the Florida panther will result from removals of additional individuals from the wild population to provide the "genetic core" for the captive population. Based on the removal regime initiated in 1991, 8 to 26 additional kittens would need to be taken from the wild population.

The most immediate potential impact associated with kitten removal would be in the form of direct injury or death to individuals during capture or after being placed in captivity. Existing capture data would support a conclusion that the likelihood of injury or death during capture would be remote. During the past 14 years more than 100 panther captures have occurred with only 1 direct, capture-related mortality resulting.

Potential long-term impacts of kitten removal could be in the form of reduced self-sustaining capabilities of the wild population (i.e. removing individuals that potentially would be recruited into the

population). Information gathered on the removal of the 10 kittens taken from the wild to date indicate that the removal regime being utilized has not resulted in significant adverse impacts to the wild population (Maehr 1993). The likelihood of significant impact would be expected to remain low as long as present population and production levels are maintained.

Potential impacts associated with other aspects of this alternative could result as individual panthers from captivity or the wild population are used (placed into or translocated within the wild population) to address genetic or demographic management needs. Placing/moving individuals within an existing panther population can result in significant social strife, which can result in injury or even death. Whenever such actions are deemed appropriate, potential adverse impacts can possibly be avoided or reduced by placing animals in areas where population-structure vacancies appear to exist and by using individuals least likely to result in significant adverse impacts (i.e. young females).

The most important impact of this alternative lies in whether it can successfully prevent extinction of the Florida panther. At the time this program was selected for implementation in 1991, it was believed to offer the most reasonable approach to a genetic management strategy that would be expected to assure the continued existence of the Florida panther. Through selective breeding in captivity and translocations in the wild, this alternative offers some opportunities for genetic management which should slow the process of genetic erosion and the manifestation of inbreeding depression. It does not, however, have the capability to increase the low level of genetic diversity existing presently in the population. In fact, existing genetic, medical and biological data now suggests that population health may have eroded to a point where avoiding extinction may not be possible without restoration of gene flow.

Based on current projections, the existing wild population would be expected to undergo a gradual decline process under this Alternative. The rate of decline would be expected to accelerate over time as demographic and genetic conditions within the population deteriorate. Genetic problems associated with inbreeding depression and lack of adaptability would be expected to contribute to the population decline process. Once a minimum threshold level is reached, the population would be expected to experience a rapid decline and eventual extinction.

- B. **Impacts to *F.c. stanleyana*** - There are no *stanleyana* involved in this alternative.
- C. **Impacts to other threatened and endangered species** - Numerous threatened and endangered species are found within the area occupied by the Florida panther in south Florida. Included among these are the caracara, bald eagle, wood stork, red-cockaded woodpecker, american alligator, eastern indigo snake, and numerous plant species. Because the Florida panthers ranges over such a large area and uses such a wide variety of habitats and landscapes it serves as somewhat of a "umbrella species" for many other species in south Florida. Specific actions to preserve and protect landscapes used by the panther also benefit many other species as well. The potential for future benefits of this nature would be lost should the panther become extinct.

This alternative would not be expected to result in significant impacts to any threatened or endangered species.

- D. **Impacts to prey resources** - Data from throughout occupied panther range in south Florida indicate that, when available, white-tailed deer and feral hogs represent the panther's preferred prey. Smaller animals, including raccoons and armadillo, are also utilized. Due to a lack of suitable unoccupied panther habitat in south Florida, significant population growth for the panther in this region is not expected to occur. Consequently, impacts to prey resources by the panther are not expected to change significantly from the current level. Because feeding activities by panthers are spread over such large areas (panther home ranges of 50 to 300 mi²), significant adverse impacts to specific prey population segments have not been reported. Under existing conditions, prey impacts are generally limited to the loss of individual prey animals from their associated populations and environs. There has been no reported population-level impacts.

Existing panther/prey relationships within panther-occupied ecosystems would be expected to undergo eventual change under a "panther population decline scenario", as is projected for this Alternative. Existing relationships would be significantly disrupted with the panthers total disappearance from the ecosystem. Population increases in some prey resources (i.e. deer & hogs) or compensatory shifts in other predator species (i.e. bobcats) could occur.

- F. **Impacts to land use** - The panther prefers large areas predominated by forest cover. The present recovery program places emphasis on

actions to preserve existing habitats important to the panther. Habitat needs for the panther, or specific actions to preserve these habitats in south Florida would not be expected to differ between the present program (Alternative 1) and any of the other alternatives. This is because the projected maximum population size in south Florida for each of the alternatives would be the same (habitat and density-limiting factors inherent to the species and area would be expected to limit the population size to an estimated 50 adults).

Ongoing land uses would not be expected to be impacted by this or any of the other alternatives. Concerns over land use generally surface at the time land use changes occur (or are proposed) that are likely to result in the loss of habitat value for the panther.

Because the Florida panther is a federally listed endangered species, statutory and regulatory provisions can potentially affect activities within the panther's occupied range. Proposed projects and land use activities within the panther's present range requiring Federal action (granting of permits, licenses, funding assistance, etc.) could be limited to only those that would not likely jeopardize the panther's continued existence. Urban and agricultural growth and development within this area could be affected, thus limiting potential economic returns to landowners. Future habitat preservation actions (leases, easements, etc.) could limit specific land use activities to those compatible with panther habitation.

In summary, maintaining the panther as a component of the south Florida ecosystem will mandate that emphasis be placed on maintaining much of the existing undeveloped areas in a natural state and that uses made of these lands be oriented around actions that are compatible with panther habitation.

- F. **Recreational impacts** - Outdoor recreational activities throughout the occupied range of the panther revolve primarily around hunting and fishing. Other activities such as hiking, bird watching, and camping occur locally. Administrative and regulatory provisions have been utilized in the past to address specific areas of concern where it was felt that use-activities were in some way limiting to panther needs. Most of these actions have been directed to publicly owned land and have been primarily designed to administer hunting and off-road vehicle activities. The need for additional restrictive actions of significance has not arisen within the last several years. Though, it is not possible to predict future needs of this nature, none are anticipated at the present. Should such needs arise in the future, they

would not be expected to be significant under this or the other alternatives.

- G. **Social impacts** - The Florida panther was designated the State Animal by the Florida Legislature in 1982. Popularity and support for this endangered animal have grown significantly since that time; especially over the past few years. This is evidenced by increased purchase of "specialty" vehicle registration plates offered by the State to help fund education, protection and recovery actions for the panther. During the first full year that "panther tags" were available (July '91-June '92) 48,089 were purchased. Last year (June '93-July '94) 133,240 tags were purchased (new tags and renewals). This represents a 177% increase in 2 years. Concern, interest and support for the Florida panther is not just limited to Florida residents. Of 495 written comments received regarding a recently proposed action for the Florida panther, 124 or 25% were from individuals in other states.

Capturing and removing panthers from the wild population for the captive population would be opposed to by a certain segment of society regardless of the reasons. Opposition to such actions would be expected to increase significantly with the projection that even with this action the panther will likely go extinct under this Alternative.

Panther/human interactions would be possible from panthers being translocated (from captivity or the wild) for demographic or genetic needs in the wild population. Based on existing data (ongoing reintroduction experiment) the likelihood of panther/human interaction would be greater for released captive-born individuals than from translocated wild individuals.

Extinction of the Florida panther, as projected under this alternative, will represent a great loss to a significant segment of society. The fact that the Florida panther is the State Animal for Florida elevates this species to a higher level of intrinsic value than would be the case otherwise. To many, the panther represents a bygone era - a last remaining entity of vast natural systems that have long since past.

Perhaps the greatest impact to a particular segment of society would be experienced by native Americans (Seminole and Miccosukee Tribes) for which the panther holds great cultural significance. The Panther Clan represents the largest among the Florida tribes.

- H. **Economic impacts** - The economy for the region occupied by the Florida panther is heavily dependent on agriculture and tourism. As indicated under Land Use Impacts above, existing land use activities are not expected to be affected by this or any of the alternatives. Thus, impacts to existing economic conditions would likewise not be expected to occur.

However, because of the projected extinction of the Florida panther under this alternative, contemplated habitat preservation actions potentially involving hundreds of thousands of acres (Logan et al. 1993) may not be carried out (see section "IV. C. Habitat" for additional information). If this is the case, potential financial gains by landowners who may choose to participate in cooperative habitat preservation actions would be lost.

Extinction of the panther as projected for this Alternative would result in the loss of millions of dollars of revenue annually to the State from the Florida panther "specialty" vehicle registration plates (this program generated over \$3.3 million in FY-94). These funds go to various state agencies for education, protection and recovery for the panther. Such programs benefit a vast array of additional flora and fauna associated with landscapes utilized by the panther.

Alternative 2 - Translocate Wild Non-Florida Individuals Into The Wild Population (Proposed Action) -- Under this alternative, a limited amount of genetic material from another *F. concolor* subspecies would be placed directly into the Florida panther population by translocating wild-caught individuals into south Florida (translocation of 8 young adult *F.c. stanleyana* females).

- A. **Impacts to *F.c. coryi*** - The most immediate potential impact would be possible intra-specific aggression between *F.c. coryi* and *F.c. stanleyana*. Data from the panther population in south Florida, the experimental cougar population in north Florida (these individuals and individuals scheduled for use in the proposed program are from the same area in Texas), and from populations throughout the range of *F. concolor* show that intra-specific aggression by females would not be expected. The fact that emphasis would be placed on using young females for translocation, and that their placement would be targeted for sites considered to have female vacancies in the social structure, would be expected to lessen the likelihood of aggression or significant impact to panthers. Monitoring programs would be expected to

quickly reveal significant problems should they occur and corrective actions could be taken if deemed appropriate.

Another potential impact could result from undesirable pathogens being introduced into the panther population from translocated individuals. Quarantining, screening and health monitoring protocols to be utilized would greatly reduce the likelihood of significant problems (details are contained on pages 13 and 14 of Enclosure 1).

Potential impacts could occur if localized prey resources were not sufficient to provide for the needs of the existing panther population, plus translocated individuals. Though prey resources may not be high throughout the occupied range of the panther, translocation would be limited only to localized areas where prey resources are considered to be more than adequate.

Other potential impacts could result if female panthers were dislodged from their present home-ranges by translocated individuals. This could result in displaced individuals being injured/killed crossing roads, or being relegated to habitats of lower quality, thus possibly affecting health and productivity, or trigger intra-specific aggression at the new site. There is no data to suggest that this is likely to happen, and again, monitoring activities would provide opportunities to take appropriate remedial action.

Potential long-range impacts could be that *stanleyana* genes swamp *coryi* genes resulting in the "loss" of the Florida panther as a distinct taxonomic unit. The program goal is that over time the genetic makeup of the total panther population be comprised of 80% *coryi* and 20% *stanleyana*. There are numerous management actions available to help achieve this goal. Such actions could include measures to prevent backcrossing with *stanleyana* females (removal/translocation of F1 males), removal of F2 litters produced via *stanleyana* backcrossing, removal of original *stanleyana* females once that have two reproducing offspring in the population, etc. Intensive monitoring is to be employed to guide the program to ensure that appropriate Florida panther genetic and morphological traits are maintained. Details are contained on pages 8-11 of Enclosure I.

Outbreeding depression, a possible negative consequence that could result from introgression, has been considered, but was rejected as an implausible outcome of the planned genetic restoration. For example, the out-crossed panthers in the Everglades sub-population have not displayed the same key physiological problems seen in the Big

Cypress segment of the population, and show no evidence of outbreeding depression. The proposed inter-crossing for genetic restoration would be between populations that are much more similar genetically, and would more recently have exchanged genes via natural emigration, than were the subspecies that were crossed in the Piper stock that was subsequently released successfully into the Everglades. Outbreeding depression would be unprecedented for a cross between such closely related and recently diverged mammalian populations as the Florida and Texas *F. concolor*.

It is important to note that the proposed action is not irreversible. All translocated individuals and their progeny could be removed at any time.

In summary, if the proposed program is implemented and successful, genetic diversity within the population would be expected to increase, the high incidence of reproductive and medical abnormalities referenced earlier would be expected to decline, the overall genetic health and fitness would be expected to improve, and opportunities for recovery of the Florida panther would be significantly enhanced. Genetic improvements would be expected to show up with the first intercrossed offspring, which would be expected to be produced within six months to a year after translocation of females.

- B. *Impacts to F.c. stanleyana* - The most immediate direct impact to *stanleyana* would be to specific individuals involved in the restoration program (the 8 individuals selected for translocation plus any others that may be captured but rejected). Potential impacts could be in the form of injury/death during capture, transportation, quarantining, release, etc. Over the past several years over 20 individuals have been captured in Texas and moved to Florida as part of the panther recovery program. Injury/death has not been a problem.

The Texas population is perhaps the largest and healthiest of all cougar populations in the United States. The removal of 8 females would not be expected to result in significant or residual impacts to the donor segments of the population.

Translocated individuals could be injured/killed through intra-specific aggression activities with resident Florida panthers. Using females and placing them in suspected population vacancies would tend to reduce this likelihood.

Competition for prey resources was addressed under Alternative 1, above.

All translocated individuals and their progeny would be protected under Federal and State endangered species statutes via existing "similarity of appearance" provisions.

- C. **Impacts to other threatened and endangered species** - Would be expected to be the same as Alternative 1.
- D. **Impacts to prey resources** - Would be expected to be the same as paragraph 1, Alternative 1.
- E. **Impacts to land use** - Would be expected to be the same as Alternative 1.
- F. **Recreational impacts** - Would be expected to be the same as Alternative 1.
- G. **Social impacts** - As indicated under Alternative 1, a segment of society would likely be opposed to capturing and/or moving wild animals for any reason. Some individuals would likely be concerned that animals from Texas might behave differently from resident animals. It may be perceived by some that Texas animals would be more inclined to depredate livestock or interact with humans. However, data from the experimental reintroduction study in north Florida involving translocated Texas cats do not support this perception.

A segment of society would be expected to assume a position that the proposed action would result in the loss of the "true" Florida panther. This belief would bother some individuals. Some would even elect to just let the panther go extinct. However, it is expected that a much greater segment of society would accept the proposed action as something necessary and appropriate to enhance survival and recovery opportunities for the panther. Some would support doing whatever is necessary to prevent extinction of the last remaining panther population in the eastern United States.

- H. **Economic impacts** - The economy for the region occupied by the Florida panther is heavily dependent on agriculture and tourism. As indicated under Land Use Impacts above, existing land use activities are not expected to be affected by this or any of the alternatives.

Thus, impacts to existing economic conditions would likewise not be expected to occur.

Alternative 3 - Translocate Intercrossed Progeny Into The Wild Population

-- Under this alternative, genetic material from another cougar subspecies (i.e. *F.c. stanleyana*) would be intercrossed with *F. c. coryi* in captivity and the progeny (F1 or F2 offspring) introduced into the Florida panther population in south Florida. To achieve the genetic admixture in the wild population that has been determined to be needed for success (80% *coryi* - 20% *stanleyana*) it would require that 16 F1 offspring or 32 F2 offspring becoming breeders in the wild population. In order to lessen potential adverse impacts to the existing population structure and enhance opportunities for reintroduced individuals becoming breeder, females would be emphasized (males more likely to create strife in population and would be expected to take longer to establish a breeding territory).

- A. **Impacts to *F.c. coryi*** - The potential for direct impacts from placing 16 to 32 individuals into the south Florida population would be expected to be significantly greater than what might occur under Alternative 2, where only 8 individuals would be involved. Unoccupied suitable habitat is likely not available to support an additional 16 to 32 individuals. Competition for available habitat could adversely impact individuals presently in the population.

The projected time to actually achieve intercrossing in the wild population, which is necessary to achieve the goals of the program, would be expected to be significantly greater for this Alternative. Under this Alternative, projections are that it would take a minimum of 2-3 years to have captive born F1 progeny produced, conditioned and ready for release into the wild population. An additional months to a year would likely be required to achieve reproduction in the wild.

The likelihood of introducing undesirable pathogens into the wild population would be expected to be extremely remote because the individuals would have been closely evaluated and monitored under captive conditions since birth.

It is projected that this alternative could achieve the goals for genetic restoration of *Felis concolor coryi*. However, compared to Alternative 2, it would be expected to take a significantly longer period of time for success and cost significantly more.

- B. **Impacts to *F.c. stanleyana*** - It is projected that approximately 16 litters of kittens would have to be produced to provide the 16 F1 females for placement into the wild population (typical litters consist of 2 kittens, one of each sex is common). This would require an estimated 10-11 additional female *F.c. stanleyana* being brought into the captive program (5-6 females [*stanleyana* and *coryi*] presently in captivity could be used). Overall impacts would not be expected to differ significantly from those identified under Alternative 2.
- C. **Impacts to other threatened and endangered species** - Would be expected to be the same as Alternative 1.
- D. **Impacts to prey resources** - The release of 16 additional panthers into the wild population could result in temporary, but possibly significant localized reductions in prey populations in some areas. However, it would be expected that eventually the panther population would adjust to carrying capacities of the habitat (probably around 30-50 adults) and impacts to the prey resource would return to present levels.
- E. **Impacts to land use** - Would be expected to be the same as Alternative 1.
- F. **Recreational impacts** - Would be expected to be the same as Alternative 1.
- G. **Social impacts** - As indicated under Alternative 1, a segment of society would be opposed to capturing wild animals and placing them in captivity. Some individuals would likely be concerned that animals produced in captivity might behave differently from resident animals. Preliminary data from the north Florida reintroduction study suggest that perhaps captive born animals are more likely to prey on livestock and have interactions with humans. Whether the pre-release conditioning program can be adjusted to address these concerns is not known at this time.

Paragraph 2 under social impacts for Alternative 2 would hold true for this alternative also.

- H. **Economic impacts** - This alternative would result in significant additional costs to the present program. Obtaining 10-11 wild Texas females for intercrossing will cost approximately \$1,500 to 2,000 each. Additionally, based on existing data (J. Lukas, pers. comm.), each captive born animal conditioned for release into the wild would

cost approximately \$30,000, or an estimated \$480,000 for 16 (the minimum number needed under this alternative).

Alternative 4 - Utilize Genetic Material From Other Captive Stock (*F.c. coryi* or *F.c. coryi* intercrosses) In The Genetic Restoration Program -- Under this Alternative, genetic material from captive animals with unknown and mixed ancestry would be introduced into the Florida panther population by directly releasing individuals into the population or by intercrossing in captivity and releasing the progeny into the population.

A thorough review and analysis of existing captive material thought to possibly contain *F.c. coryi* genes over the past decade have not identified a source of genetic material that is considered suitable for use under this alternative. Because an acceptable source has not been located, a detailed analysis of potential impacts that could possibly be associated with this "hypothetical" action will not be carried out herein. In general, however, impacts associated with the implementation of an alternative such as this would, for the most part, be expected to be similar to those for Alternative 3.

Table 2. Summary of projected environmental impacts by alternative.

IMPACT	ALTERNATIVE 1 (No Action)	ALTERNATIVE 2 (Proposed Action)	ALTERNATIVE 3	ALTERNATIVE 4
<i>F.c. coryi</i>	To wild pop.: Initially - moderate, Long-term - extinction predicted.	Would be expected to prevent extinction.	Potentially significant through competition for available habitat. Would be expected to prevent extinction.	Would be expected to be similar to Alternative 3
<i>F.c. stanleyana</i>	NA	Low	Low	"
Other T&E species	Low	Low	Low	"
Prey resources	Low	Low	Could be low-moderate initially.	"
Land use	Low	Low	Low	"
Recreation	Low	Low	Low	"
Social	Initially - Low. Significantly greater if extinction occurs.	Low	Moderate (possibility for panther/human interactions greater)	"
Economic	Initially - Low. Possibility for significant negative impact if extinction occurs.	Low	Low	"